

EXPLANATION OF THE PLATES.

PLATE III.

Figs. 1, 2. Plant of *Nanothamnus sericeus*, natural size.

Fig. 3. Capitulum.

Fig. 4. Floret.

Fig. 5. Achene.

Fig. 6. Anthers.

Fig. 7. Style.

Fig. 8. Upper part of Style. All magnified.

PLATE IV.

Plant of *Catamixis baccharoides*, natural size.

Fig. 1. Capitulum.

Fig. 2. Involucral scale.

Fig. 3. Floret.

Fig. 4. Upper part of Style.

Fig. 5. Hairs of Pappus. All magnified.

Notes on some of the Climbing-Plants near Desterro, in South Brazil. By Herr FRITZ MÜLLER, in a Letter to C. DARWIN, Esq., F.R.S., F.L.S., &c.

[Read Dec. 7, 1865.]

(PLATE IX.)

IN your Paper on the "Movements and Habits of Climbing-Plants," you say that you have seen no tendrils formed by the modification of branches, and you even seem to entertain some doubt whether such tendrils exist. In the genus *Strychnos*, the tendrils are called by Endlicher *ramuli cirriformes*, and I have now satisfied myself that they really are of this nature. On the branches of upright shoots of a *Strychnos* which grows here, the tendrils are disposed in a very regular manner. On the branches, the leaves of the first, third, fifth, &c. pairs are horizontal, those of the second, fourth, and sixth pairs are vertical in relation to the main axis; and it is from the angles of every under leaf of these latter pairs that the tendrils spring. Now, on the points commonly occupied by tendrils, true branches are sometimes developed. The leaves from the angles of which the tendrils spring are often much reduced in size, while in other cases they are but little or not at all changed. Each tendril bears near its tip a pair of rudimentary leaves; and whilst very young the tendrils are straight, but soon become curved downwards and rolled into a helix, whether they have clasped a support or not. This *Strychnos* is a very inefficient climber; the short stiff tendrils but rarely catch anything.

A member of the Hippocrateaceæ, probably a *Tontelia*, is likewise a branch climber. One of its branches, three feet in length, had not as yet developed leaves, and resembled a gigantic tendril, with most of its lateral branchlets already grasping neighbouring objects. From the angles of the tendril-branches, other branches arise, which as far as I have seen, are not sensitive, and never clasp anything. This latter arrangement must be serviceable to the plant; for such branches grow upright without being arrested in their course, whilst the plant is secured by the tendril-branches.

Caulotretus, one of the Leguminosæ, offers another case of tendrils being formed from modified branches. In the species which I observed, the branches bear tendrils only in the angle of their first leaf, and this leaf is always rudimentary. In young shoots it might, at first sight, be thought that tendrils spring from the axils of all their leaves. In this plant every tendril appears to consist of two parts, separated by a small swelling—the inferior being straight; the superior curved, with its end rolled into a helix. But what appears to be the inferior part of a tendril is in fact the first internode of a young branch, the swelling being its terminal bud, and the tendril really springs from this young branch, from the angle of its first squamiform leaf, but nevertheless accompanied by two stipules. The end of the tendril very soon rolls up into a helix; but it does not lose by this the faculty of catching a support; on the contrary I know of no other tendrils which become entangled with small objects so easily as these rolled-up, highly elastic tendrils of the *Caulotretus*.

By far more interesting than the tendrils of *Strychnos* and *Caulotretus* are those (Pl. IX. figs. 1 and 2) of a climbing Papilionaceous plant with a woody stem, which from its general aspect I suppose to belong to the *Dalbergiæ*, Benth. They consist of thin, slender, flexible, leafless branches, with numerous (12–25) internodes, armed with sharp, hard, hook-like stipules. The young, soft, herbaceous shoots of this plant which rise from the ground are leafless. I saw one, seven feet high, which in its lower half was naked, while the upper half bore about a dozen tendrils stretched out in every direction. The oldest of these tendrils were from nine to twelve inches long, and armed with from twelve to sixteen pairs of sharp hooks: at the sides of the younger tendrils there were large, foliaceous, deciduous stipules, and at their bases very small bract-like leaves. The hooks of the tendrils are evidently stipules, which so often in this family assume the form of hooks or spines; in fact, while in the older tendrils they are

strongly curved, and have a hard, sharp, darkly coloured apex, at the summits of the younger ones they are straight, soft, and green, resembling in this early state the much larger stipules at the bases of the tendrils. Afterwards, on the summit of the shoot, true leaves are developed at the bases of the tendrils instead of the small rudimentary ones; and finally, when the plant has reached the light, and spreads over the upper surface of a thicket or tree, the tendrils disappear. The inverse may be observed when the plant sets out on the conquest of a new dominion, a neighbouring tree for instance. Then a branch bearing only leaves begins to produce on its tip tendrils supported by leaves, and finally, growing rapidly to a long slender shoot, it produces only tendrils, the leaves being replaced by small squamæ. Thus in this plant, the branches assume four different shapes:—1st, tendrils, leafless, armed with hook-like stipules; 2nd, long, slender, leafless shoots, bearing tendrils and broad deciduous stipules; 3rd, branches with leaves, from the axils of which tendrils spring; and 4th, branches bearing only leaves without tendrils. Between the leaf and the tendril there is an accessory bud (fig. 1 *b*), which often develops into a branch; these branches issuing from the accessory buds seem never to produce tendrils. The tendrils, after having clasped a support, thicken partially where they are in contact with it (fig. 1 *a*). Tendrils which have caught nothing behave in different ways. Some wither and fall after contracting irregularly. Others likewise become flexuous, or contract into a spire, or occasionally into a helix, but remain, thickening somewhat and becoming ligneous and rigid. Others produce branches from one or some of their internodes: this also occurs, and perhaps more frequently, with tendrils which have found a support; in this case the tendrils thicken much, and sometimes attain a diameter of more than one inch (fig. 2 *a*, a thickened tendril clasping a branch of a *Psidium*; *b*, branch issuing from the tendril; *c*, tendril-bearing branch; *d*, branch from an accessory bud, without tendrils). Lastly, the tendrils even transform themselves into true branches: in this case they may remain nearly straight or become but little flexuous, and at their ends they produce leaves; the first of these leaves have sometimes hook-like persistent stipules, like those of the tendril, while the stipules of the following leaves are deciduous like those on other branches. These tendrils often become much elongated. I saw a shoot, almost all the tendrils of which were developed into serpentine branches; and under each of these branches there was a straight branch from an acces-

sory bud. One of the tendrils was thirty inches long; it had twenty-five pairs of hooks, and at the tip three short internodes with leaves and destitute of hooks; from its seventeenth internode a branch arose. Excepting their hook-like stipules, by which they may be easily recognized, the branches formed by tendrils resemble in almost every respect the ordinary branches; but, as far as I have seen, they never produce tendrils, nor do the branches which spring from an internode of a tendril or (as I have already stated) from an accessory bud.

If we restrict the name of tendrils to filamentary organs used *exclusively* for climbing, those of the present plant would be excluded; for after having done their work as tendrils, they may be transformed into, and do all the work of, branches.

While in this plant the highly modified tendrils may be changed again into true branches, in two other plants which I have seen, the branches themselves, without having suffered any modification, act as tendrils. One of these plants belongs to the *Dalbergiæ*. Many of its branches had clasped small branches of a tree. These tendril branches, as they may be called, had not continued to grow beyond the support; and where they touched it, most of them had thickened: some showed a tendency to spiral contraction, forming a semicircle between the support and the stem. The plant does not twine. I may add that another genus, belonging to the same section of the Leguminosæ, namely *Hecastaphyllum*, is also a branch climber.

The second plant above referred to is a *Securidaca* (Polygalaceæ), and a most powerful climber (fig. 3). Its branches often curve in a very odd and complicated manner. Thus I saw a thin branch, which with its lateral twigs had become curved like ribs into semicircles (about four inches in diameter), imitating the bones of the thorax; from the twigs sprang secondary branchlets, which were very regularly curved, twisted together, and formed into a sort of network around the middle hollow space. When the branches wind round a support, they thicken and become more rigid, like true tendrils; but even these thickened parts may bear leaves or secondary branches. In the preceding plant the branches seem to be arrested in their longitudinal growth when they clasp a support; in the present plant they continue to grow, and the same branch may successively catch different objects. The branches which project freely from a thicket are rather thin and slender: with their twigs spreading all in the same horizontal plane and diminishing in length towards

the extremity of the branch, and with their leaves arranged in two horizontal rows, they apparently form gigantic bipinnate leaves; and when covered with their bluish-purple flowers, this *Securidaca* is one of the most elegant and magnificent plants of our flora.

From the last two plants it is but one step to the primordial and simplest condition of branch climbers, exhibited by the numerous species which scramble up a thicket without twining and without the aid of rootlets, hooks, or tendrils.

Thus we can trace in the development of branch climbers the following stages:—

1. Plants supporting themselves only by their branches stretched out at right angles—for example, *Chiococca*.

2. Plants clasping a support with their branches unmodified—*Securidaca* (*Hippocratia* according to Endlicher, Gen. Plant. No. 5700, “arbores v. frutices, ramis contortis scandentes”).

3. Plants climbing with the tendril-like ends of their branches. According to Endlicher (Gen. Pl. No. 5745), this is the case with *Helinus* (“ramulorum apicibus cirrhosis scandens”).

4. Plants with highly modified tendrils, which may, however, be transformed again into branches—for example, the above-mentioned Papilionaceous plant.

5. Plants with tendrils used exclusively for climbing—*Strychnos*, *Caulotretus*.

I will here add a few miscellaneous observations. You describe some species of *Bignonia* in which the tips of the tendrils become enlarged and adhesive after remaining for a short time in contact with some object; but the trifid tendrils of *Haplolophium*, one of the Bignoniaceæ, terminate (without having come into contact with any object) in smooth shining disks, which, however, after adhesion, sometimes become considerably enlarged. In *Cardiospermum* you state that the common peduncle which bears the subpeduncles with the flower-buds and the pair of short tendrils, although it spontaneously revolves, does not bend on contact or contract spirally; hence it may be worth mentioning, as showing a difference in the action of the tendrils in related genera, that in *Serjania* the common peduncle contracts spirally when the single tendril which it bears has clasped, as frequently happens, the plant's own stem.

With respect to spirally twining plants, you state that though the *Hibbertia dentata* sometimes revolves in one direction and sometimes in the other, yet it invariably twines from left to right.

But in another genus belonging to the same family, namely the *Davilla*, the stem twines indifferently from left to right or from right to left; and I once saw a shoot, ascending a tree about five inches in diameter, reverse its course in the same manner as so frequently occurs with *Loasa*. Although individuals, as we have just seen, in some few cases twine in opposite directions, yet you say that you have not as yet met with any case of two species in the same genus twining in opposite directions, and you are able to give only two cases of species within the same natural order thus twining. But a *Mikania* growing here twines from right to left, whilst the *Mikania scandens* described by you twines in an opposite direction; and I believe that there are species of *Dioscorea* which twine in opposite directions. Lastly, with respect to the thickness of the support which can be ascended by spirally twining plants, I have lately seen a trunk about five feet in circumference which was thus ascended by a plant apparently belonging to the Menispermaceæ.

On a Double-flowered Variety of *Orchis mascula*.

By MAXWELL T. MASTERS, M.D., F.L.S.

[Read Dec. 7, 1865.]

[PLATES X. & XI.]

IN May last, Dr. Moore, of Glasnevin, laid before the Royal Dublin Society flowers of this curious Orchid, gathered at the Bridge of Allan by Dr. Patterson, and subsequently was good enough to forward the specimens to me for more complete examination and description. Dr. Moore's brief account may be found in the Proceedings of the above-named Society (May 15, 1865); but, as my interpretation of these flowers differs somewhat from that given by my friend, I think it right to reproduce his remarks in this place before proceeding to give the results of my own examination.

"The flowers," writes Dr. Moore, "are reversed on the axis which bears them, the labellum being next the axis in place of the sepals being uppermost, which is the normal state of the flower. The changes of the parts are very curious and interesting. On the sides of the labellum are two smaller labella with short spurs; and in the axils of these, other flowers spring, thus rendering the morphology axillary. These secondary florets have, again, rudimentary florets in the axils of their changed labella; there is no